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09/780,501	02/12/2001	Sadayuki Abeta	202863US2	8133

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EXAMINER	
MAIS, MARK A	

ART UNIT	PAPER NUMBER
2619	

NOTIFICATION DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	09/780,501	ABETA ET AL.	
	Examiner	Art Unit	
	Mark A. Mais	2619	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *30 October 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *See Continuation Sheet* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *7,8,10,11,13,14,16,17,19,20,28,29,31,32,34,35,37,38,40,41 and 50-52.* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Continuation of Disposition of Claims: Claims pending in the application are 7,8,10,11,13,14,16,17,19,20,28,29,31,32,34,35,37,38,40,41 and 50-52.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on October 30, 2007 has been entered.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 7, 8, 10, 11, 13, 14, 16, 17, 19, 20, 28, 29, 31, 32, 34, 35, 37, 38, 40, 41 and 51-52 are rejected under 35 U.S.C. 102(e) as being anticipated by Sakoda et al. (USP 6,563,881) and

102(b) as being anticipated by Sakoda et al. (WO 00/03508) [USP 6,563,881 serving as English translation for WO 00/03508—hereinafter referred to as Sakoda et al.].

4. With regard to claim 7, Sakoda et al. discloses a multi-carrier CDMA radio transmitting method **[e.g., col. 1, lines 18-29 regarding DC-CDMA and col. 2, lines 53-59 and col. 4, lines 39-59 regarding transmission in a multi-carrier scheme]** replicating each information symbol **[e.g., Fig. 17, see symbol repetition unit 152; col. 15, line 41 to col. 16, line 15]** disposing a thus-obtained information symbols along a frequency axis **[e.g., see col. 10, lines 30-32 and col. 15, line 41 to col. 17, line 49 regarding frequency axis]**, multiplying the thus-obtained information symbols by a spreading code along a frequency axis **[e.g., see col. 5, lines 18-25 regarding spreading multiplexed signals; and see col. 1, lines 51-59 regarding spreading performed with a spread factor]**, thus spreading the information symbols into components of a plurality of sub-carriers having different frequencies **[e.g., see col. 4, lines 39-59; col. 5, lines 18-42; and col. 10, lines 23-44]**, and thus rendering multiplex transmission of the information **[e.g., see col. 5, line 18 to col. 6, line 3]**, comprising the step of:

enabling a transmission rate of the information to be changed **[e.g., see col. 6, lines 4-8; col. 6, line 66 to col. 7, line 10; and col. 9, lines 12-28 regarding transmission rates]** by *variably* controlling *a duration of a* multiplex transmission *interval* between a first transmission *of a symbol* and a subsequent transmission *of a symbol*, along a time axis **[e.g., see col. 10, lines 15-44 regarding time axis, and see col. 12, lines 3-16 regarding multiplexed transmissions; frequency intervals can be variably set depending on the transmission rate of the transmit data (col. 5, line 60 to col. 6, line 8); multiplexing multiple channels (col. 12, lines 17-36)**

involves control of the sampling period (i.e., over time) (col. 12, line 37 to col. 13, line 42); there is *necessarily* a relationship between the modulation levels and the transmission rate such that one may change with the other. Although the specific modulation scheme/levels may be different, Sakoda et al. discloses controlling the transmission rate by controlling the number of modulation levels; the fact that Sakoda et al. controls the transmission interval by spreading the symbols into sub-carriers at different frequencies necessarily means that the radio transmission has been converted (FFT/IFFT) and that the transmitted symbols must necessarily have a time-component in the time-axis (FFT/IFFT; round-trip delay; etc.) (page 10, lines 15-44)].

] for each user to which information is to be transmitted **[e.g., see col. 6, line 66 to col. 7, line 10 (e.g., minimum sample rate); col. 9, line 10 to col. 22, line 7; and col. 25, line 59 to col. 28, line 13]**.

5. With regard to claim 8, Sakoda et al. discloses a multi-carrier CDMA radio transmitting method **[e.g., col. 1, lines 18-29 regarding DC-CDMA and col. 2, lines 53-59 and col. 4, lines 39-59 regarding transmission in a multi-carrier scheme]** replicating each information symbol **[e.g., Fig. 17, see symbol repetition unit 152; col. 15, line 41 to col. 16, line 15]** disposing a thus-obtained information symbols along a frequency axis **[e.g., see col. 10, lines 30-32 and col. 15, line 41 to col. 17, line 49 regarding frequency axis]**, multiplying the thus-obtained information symbols by a spreading code along a frequency axis **[e.g., see col. 5, lines 18-25 regarding spreading multiplexed signals; and see col. 1, lines 51-59 regarding spreading performed with a spread factor]**, thus spreading the information symbols into components of a

plurality of sub-carriers having different frequencies **[e.g., see col. 4, lines 39-59; col. 5, lines 18-42; and col. 10, lines 23-44]**, and thus rendering multiplex transmission of the information **[e.g., see col. 5, line 18 to col. 6, line 3]**, comprising the step of:

enabling a transmission rate of the information to be changed **[e.g., see col. 6, lines 4-8; col. 6, line 66 to col. 7, line 10; and col. 9, lines 12-28 regarding transmission rates]** by controlling the number of modulation levels used for each user *by increasing or decreasing the number of levels used within the digital modulation scheme* **[e.g., see col. 12, lines 17-36 regarding differential modulation; and see col. 17, line 64 to col. 19, line 31 regarding controlling differential modulation levels; moreover, it is inherent that controlling the modulation levels involves increasing or decreasing the number of levels (e.g., modulation time of one symbol); there is *necessarily* a relationship between the modulation levels and the transmission rate such that one may change with the other. Although the specific modulation scheme/levels may be different, Sakoda et al. discloses controlling the transmission rate by controlling the number of modulation levels]** when the information symbols to be spread are obtained through data manipulation **[e.g., see col. 6, line 66 to col. 7, line 10; col. 9, line 10 to col. 22, line 7; and col. 25, line 59 to col. 28, line 13]**.

6. With regard to claim 28, Sakoda et al. discloses a multi-carrier CDMA radio transmitting apparatus **[e.g., col. 1, lines 18-29 regarding DC-CDMA and col. 2, lines 53-59 and col. 4, lines 39-59 regarding transmission in a multi-carrier scheme]** replicating each information symbol **[e.g., Fig. 17, see symbol repetition unit 152; col. 15, line 41 to col. 16, line 15]** disposing a thus-obtained information symbols along a frequency axis **[e.g., see col. 10, lines 30-**

32 and col. 15, line 41 to col. 17, line 49 regarding frequency axis], multiplying the thus-obtained information symbols by a spreading code along a frequency axis **[e.g., see col. 5, lines 18-25 regarding spreading multiplexed signals; and see col. 1, lines 51-59 regarding spreading performed with a spread factor]**, thus spreading the information symbols into components of a plurality of sub-carriers having different frequencies **[e.g., see col. 4, lines 39-59; col. 5, lines 18-42; and col. 10, lines 23-44]**, and thus rendering multiplex transmission of the information **[e.g., see col. 5, line 18 to col. 6, line 3]**, comprising:

an intermittent control part **[e.g., inherently within the transmitter; Fig. 6; *See also* col. 6, lines 4-8; col. 6, line 66 to col. 7, line 10; and col. 9, lines 12-18 regarding transmission rates]** *variably* controlling *a duration of a* multiplex transmission *interval* between a first transmission *of a symbol* and a subsequent transmission *of a symbol* along a time axis **[e.g., see col. 10, lines 15-44 regarding time axis, and see col. 12, lines 3-16 regarding multiplexed transmissions; frequency intervals can be variably set depending on the transmission rate of the transmit data (col. 5, line 60 to col. 6, line 8); multiplexing multiple channels (col. 12, lines 17-36) involves control of the sampling period (i.e., over time) (col. 12, line 37 to col. 13, line 42); there is *necessarily* a relationship between the modulation levels and the transmission rate such that one may change with the other. Although the specific modulation scheme/levels may be different, Sakoda et al. discloses controlling the transmission rate by controlling the number of modulation levels; the fact that Sakoda et al. controls the transmission interval by spreading the symbols into sub-carriers at different frequencies necessarily means that the radio transmission has been converted (FFT/IFFT) and that the transmitted symbols must necessarily have a time-component in**

the time-axis (FFT/IFFT; round-trip delay; etc.) (page 10, lines 15-44)] for each user to which information is to be transmitted **[e.g., see col. 6, line 66 to col. 7, line 10 (e.g., minimum sample rate); col. 9, line 10 to col. 22, line 7; and col. 25, line 59 to col. 28, line 13]**.

7. With regard to claim 29, Sakoda et al. discloses a multi-carrier CDMA radio transmitting apparatus **[e.g., col. 1, lines 18-29 regarding DC-CDMA and col. 2, lines 53-59 and col. 4, lines 39-59 regarding transmission in a multi-carrier scheme]** replicating each information symbol **[e.g., Fig. 17, see symbol repetition unit 152; col. 15, line 41 to col. 16, line 15]** disposing a thus-obtained information symbols along a frequency axis **[e.g., see col. 10, lines 30-32 and col. 15, line 41 to col. 17, line 49 regarding frequency axis]**, multiplying the thus-obtained information symbols by a spreading code along a frequency axis **[e.g., see col. 5, lines 18-25 regarding spreading multiplexed signals; and see col. 1, lines 51-59 regarding spreading performed with a spread factor]**, thus spreading the information symbols into components of a plurality of sub-carriers having different frequencies **[e.g., see col. 4, lines 39-59; col. 5, lines 18-42; and col. 10, lines 23-44]**, and thus rendering multiplex transmission of the information **[e.g., see col. 5, line 18 to col. 6, line 3]**, comprising:

a modulation level control part **[e.g., inherently within the transmitter; Fig. 6; *See also* col. 6, lines 4-8; col. 6, line 66 to col. 7, line 10; and col. 9, lines 12-18 regarding transmission rates]** enabling a transmission rate of the information to be changed **[e.g., see col. 6, lines 4-8; col. 6, line 66 to col. 7, line 10; and col. 9, lines 12-28 regarding transmission rates]** by controlling the number of modulation levels used for each user *by increasing or decreasing the number of levels used within the digital modulation scheme* **[e.g., see col. 12,**

lines 17-36 regarding differential modulation; and see col. 17, line 64 to col. 19, line 31 regarding controlling differential modulation levels; moreover, it is inherent that controlling the modulation levels involves increasing or decreasing the number of levels (e.g., modulation time of one symbol); there is *necessarily* a relationship between the modulation levels and the transmission rate such that one may change with the other. Although the specific modulation scheme/levels may be different, Sakoda et al. discloses controlling the transmission rate by controlling the number of modulation levels] when the information symbols to be spread are obtained through data manipulation **[e.g., see col. 6, line 66 to col. 7, line 10; col. 9, line 10 to col. 22, line 7; and col. 25, line 59 to col. 28, line 13]**.

8. With regard to claims 10-11 and 31-32, Sakoda et al. discloses respective sub-carriers assigned for the spreading of the information symbols are orthogonal along the frequency axis **[e.g., see col. 9, line 10 to col. 10, line 44; col. 24, lines 16-35 regarding orthogonality]**.

9. With regard to claims 13-14 and 34-35, Sakoda et al. discloses that the respective sub-carriers assigned for the spreading of the information symbols have frequency characteristics such that the frequency spectra do not overlap between each adjacent sub-carrier **[e.g., see col. 9, line 10 to col. 10, line 44]**.

10. With regard to claims 16-17, 19-20, 37-38, and 40-41, Sakoda et al. discloses that the sub-carriers assigned for the spreading of each information symbol are disposed discretely, successively, and continuously along the frequency axis **[e.g., col. 9, line 10 to col. 10, line 44]**.

11. With regards to claims 51 and 52, Sakoda et al. discloses the modulation level of at least one of a quadrature modulation or phase shift keying **[col. 12, lines 17-36; e.g., 16-QAM, QPSK, and 8-PSK]** is increased or decreased to a number being a power of 2 **[col. 17, line 64 to col. 19, line 31; e.g., modulating from 1 [2^0] to ¼ [2^{-2}] of the modulation time of one symbol—which is the same as modulating from 16-QAM to 64-QAM (as disclosed in Applicant's Amendment dated January 31, 2007, page 10, paragraph 4)]**].

Claim Rejections - 35 USC § 103

12. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

13. Claims 50 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sakoda et al.

14. Sakoda et al. discloses enabling a transmission rate of the information to be changed **[e.g., see col. 6, lines 4-8; col. 6, line 66 to col. 7, line 10; and col. 9, lines 12-28 regarding transmission rates]** by controlling the number of modulation levels used for each user by increasing or decreasing the number of levels used within the digital modulation scheme **[e.g., see col. 12, lines 17-36 regarding differential modulation; and see col. 17, line 64 to col. 19,**

line 31 regarding controlling differential modulation levels; moreover, it is inherent that controlling the modulation levels involves increasing or decreasing the number of levels (e.g., modulation time of one symbol); there is *necessarily* a relationship between the modulation levels and the transmission rate such that one may change with the other. Although the specific modulation scheme/levels may be different, Sakoda et al. discloses controlling the transmission rate by controlling the number of modulation levels] when the information symbols to be spread are obtained through data manipulation **[e.g., see col. 6, line 66 to col. 7, line 10; col. 9, line 10 to col. 22, line 7; and col. 25, line 59 to col. 28, line 13]**. Sakoda et al. does not specifically disclose that the intervals are adjusted prior to spreading.

However, Applicants have not disclosed that adjusting the intervals prior to spreading solves any stated problem or is for any particular reason. There is already a well-known inverse relationship between increasing the transmission rate and shortening the data transmission interval [as well as decreasing the transmission rate by lengthening the data transmission interval]. Applicants have not disclosed that adjusting the intervals prior to spreading solved any stated problem or is for any particular purpose other an optimization of a known method of controlling the multiplex transmission intervals along a time axis. Accordingly, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify when the intervals are adjusted in view of Sakoda et al. because such modifications are considered a mere design choice consideration, which fails to patentably distinguish over the prior art of Sakoda et al. In addition, modifying when the intervals are adjusted is interpreted as an optimum value for a known process. A discovery of an optimum value for a known process is obvious engineering. See In re Aller, 105 USPQ 233 (CCPA 1955).

Response to Arguments

15. Applicant's arguments filed on October 30, 2007 have been fully considered but they are not persuasive.

16. With respect to claims 7 and 28, Applicants state that Sakoda et al. discloses a null symbol insertion unit is provided to make a symbol rate equal to a maximum transmission rate but, apparently, does not variably control a duration of a multiplex transmission interval between a first transmission of a symbol and a subsequent transmission of a symbol along a time axis **[See Applicant's Amendment dated October 30, 2007, page 8, paragraph 4 to page 9, paragraph 3]**. The examiner respectfully disagrees.

17. As noted in the rejections of claims 7 and 28 above, Sakoda et al. discloses the amended claim limitations **[e.g., see col. 10, lines 15-44 regarding time axis, and see col. 12, lines 3-16 regarding multiplexed transmissions]**. Frequency intervals can be variably set depending on the transmission rate of the transmit data **[col. 5, line 60 to col. 6, line 8]**. Multiplexing multiple channels **[col. 12, lines 17-36]** involves control of the sampling period (i.e., over time) **[col. 12, line 37 to col. 13, line 42]**. There is *necessarily* a relationship between the modulation levels and the transmission rate such that one may change with the other. Although the specific modulation scheme/levels may be different, Sakoda et al. discloses controlling the transmission rate by controlling the number of modulation levels **[*See also* col. 6, line 66 to col. 7, line 10**

(e.g., minimum sample rate); col. 9, line 10 to col. 22, line 7; and col. 25, line 59 to col. 28, line 13]. The fact that Sakoda et al. controls the transmission interval by spreading the symbols into sub-carriers at different frequencies necessarily means that the radio transmission has been converted (FFT/IFFT) and that the transmitted symbols must necessarily have a time-component in the time-axis (FFT/IFFT; round-trip delay; etc.) **[page 10, lines 15-44]**.

18. With respect to claims 8 and 29, Applicants state that Sakoda et al. discloses a transmission configuration that uses streams of the same transmission rate but, apparently, does not teach that a transmission rate of the information is changed by controlling the number of modulation levels for each user by increasing or decreasing the number of levels **[See Applicant's Amendment dated October 30, 2007, page 9, paragraph 3 to page 10, paragraph 2]**. The examiner respectfully disagrees.

19. As noted in the rejections of claims 8 and 29 above, Sakoda et al. discloses the amended claim limitations **[e.g., see col. 12, lines 17-36 regarding differential modulation; and see col. 17, line 64 to col. 19, line 31 regarding controlling differential modulation levels]**. Moreover, it is inherent that controlling the modulation levels involves increasing or decreasing the number of levels (e.g., modulation time of one symbol). There is *necessarily* a relationship between the modulation levels and the transmission rate such that one may change with the other. Although the specific modulation scheme/levels may be different, Sakoda et al. discloses controlling the transmission rate by controlling the number of modulation levels **[*See also* col. 6,**

line 66 to col. 7, line 10; col. 9, line 10 to col. 22, line 7; and col. 25, line 59 to col. 28, line 13].

Conclusion

20. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

(a) Geile (USP 7,310,522), Systems and synchronous multipoint-to-point orthogonal frequency division multiplexing communication.

(b) Sano et al. (USP 7,272,162), Transmitter and receiver for spread-spectrum communication system, and modulation and demodulation methods thereof.

(c) Lou (USP 7,002,898), Asymmetrical transport of data

(d) Sakoda et al. (USP 6,992,973), Transmitting apparatus, receiving apparatus, communication system, transmission method, reception method, and communication method.

(e) Okada et al. (USP 6,980,509), Transmitting device and method and providing medium.

(f) Sakoda et al. (USP 6,977,884), Transmitting apparatus, receiving apparatus, communication system, transmission method, reception method, and communication method.

(g) Sakoda et al. (USP 6,882,618), Transmitting apparatus, receiving apparatus, communication system, transmission method, reception method, and communication method.

(h) Black et al. (USP 6,798,736), Method and apparatus for transmitting and receiving variable rate data.

(i) Hornsby et al. (USP 6,396,803), Modulation methods and structures for wireless communication systems and transceivers.

(j) Sakoda (USP 6,816,555), Transmitting apparatus, receiving apparatus, communication system, transmission method, reception method, and communication method.

21. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mark A. Mais whose telephone number is 572-272-3138. The examiner can normally be reached on M-Th 5am-4pm.

22. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wing F. Chan can be reached on 571-272-7493. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

23. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

MAM

December 11, 2007

1/2/08

WING CHAN
SUPERVISORY PATENT EXAMINER